Space Weather Forecast

Issued on Tuesday, 23 January 2024 at 13:09 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: CME (coronal mass ejection) arrival forecast late on 25 January or early on 26 January, with Minor to Moderate storming likely. Moderate solar activity likely to continue. Chance of radiation storms throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There are seven sunspot regions on the visible disc. The most active is a rapidly developing large and magnetically complex region in the southwest of the disc. This large growth and complexity has led to the production of a number of Moderate-class flares. A large and complex region in the northeast has also produced multiple Moderate-class flares. The remaining regions all appear mature or stable.

The most significant coronal mass ejection (CME) in the forecast so far was from the south centre disc around 22/1000UTC. This has been modelled with a possible arrival late on 25 January or early 26 January. There also appear to have been four more CME's associated with Moderate-class flares, which will be all be analysed once sufficient imagery becomes available. All other CME's visible in satellite imagery appear to have been far-sided or not Earth-directed.

Solar Wind / Geomagnetic Activity: Solar winds increased from slightly elevated to close to elevated levels during the afternoon of 22 January due to a CME arrival, but have since declined again. Total magnetic field strength reached Moderate levels following the CME arrival, but has now declined back to Weak. The important north-south component of the total magnetic field varied moderately for a time due to the perturbations caused by the CME, but has now returned to normal weak variations. Resultant geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: Although no solar radiation storms were observed, levels increased close to the S1 (Minor Storm) threshold before subsiding.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected throughout from large regions in the southwest and northeast. There is also a slight chance of Strong-class flares.

Solar Wind / Geomagnetic Activity: A CME is forecast to arrive at Earth late on 25 January or early on 26 January, giving a chance of Minor or Moderate Storm intervals late on 25 January, becoming more likely into 26 January.

Energetic Particles / Solar Radiation: There is a daily chance of S1/Minor radiation storms through the period due to the two complex sunspots in the northeast and southwest, which both carry a high risk of producing radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	40	60
Strong	G3	No	1	1	5	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	30	25	25	25
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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